

This is a scientific report regarding a shark dissection I did in my 8th Grade Living Environments class. The work below shows the prompts and my responses to them, making a coherent report of my findings. This is one of my more technical pieces.

Purpose:

Write 1-2 paragraphs, introducing the reader to what you did and how you did it. Refer to the focus question of the lab. What is the purpose of dissecting a shark? Why did we do this lab? Why do we dissect organisms in general? Introduce the reader to the rest of the report.

Aelius Galen, a famous greek philosopher, accurately described the anatomy of human kidneys. However, he didn't have diagrams of the interior of the human body nor a human body to dissect, as it was forbidden in greek law to perform human dissection. So, the question arises- how could he possibly have known with such distinction how a human kidney looks like? The answer lies in a pig. The procedure of animal dissection, more specifically. Galen extracted a liver from a pig and with his scientific knowledge and research, he deemed that a pig's liver shared close resemblance to a human's liver. Jumping centuries ahead, animal dissections are being practiced among a much larger audience. However, their purpose has not changed. Animal dissections continue to serve as a great method to educate people about both the inner and exterior anatomy of an animal. This report will be discussing findings derived from the dissection of the spiny dogfish shark.

Background:

*Write 2-3 paragraphs on general information about the spiny dogfish shark (*Squalus acanthias*) that you dissected. Research as much information on this interesting species as you can. Include information such as the meaning of its name, interesting characteristics, where it lives, what it eats, how it reproduces, etc. Avoid plagiarism by summarizing the information that you find and putting it in your own words! (See the information that your group researched about the sharks).*

The Spiny Dogfish Shark are quite a fascinating species. They can be found worldwide in temperate and subarctic waters, such as the North Atlantic and North Pacific oceans. These sharks have also been found in the Black sea and Mediterranean sea. (Enchanted Learning, "All About Sharks") Their diet consists of predominantly, fish and other sharks, however, there are also exceptions to squid, octopus and shrimp. (Monterey Bay Aquarium, "Spiny Dogfish") These small sharks are hunted by larger species of fish, seals and killer whales. Often, to defend itself, the spiny dogfish may inject venom into its victims, from the two spines near its dorsal fins. (Oceana, "Spiny Dogfish") The Spiny Dogfish Shark also has a quite lengthy lifespan. According to Shark Info- "Male dogfish reach maturity at 11 years old; female dogfish reach maturity at 19-20 years old... Estimates of the dogfish's life span range from 25-100 years. The spiny dogfish shark is very abundant, the most common shark alive." Spiny Dogfish Sharks have pretty standard means for reproduction. Shark Info also reports that- "Generally, they have an above-average pregnancy period of 18-24 months which is longer compared to other shark species. Usually spiny dogfish do not exceed a length of approximately 120 cm, whereby sexual maturity is usually reached by males measuring 60 to 70 cm and females measuring 70 to 100 cm." (Shark Info, "Fact Sheet: Spiny Dogfish") The Spiny Dogfish Shark is characterized for its relatively small size but as well for its aggressive manner.

Materials:

List the materials you used during this dissection. Example:

- Goggles
- Scalpel
- Dogfish shark specimen
- Gloves
- Scissors
- Probe

Procedure:

Type up a numbered list of the steps that you performed in carrying out the dissection. Be specific and include all of the steps that you performed including locations and descriptions of major physical features and the materials that you used at each step so that someone else could easily perform the same dissection. (You may copy and paste your procedure from above if it is an accurate description of your dissection experience).

1. Place on your goggles and plastic gloves
2. Unwrap the fish slowly, and observe/feel the exterior. What do you notice?
3. Take notes on the shark's fins, spiracles and other exterior elements.
4. Place the fish on the table/flat surface, facing belly up
5. Take the scalpel and make three incisions. One horizontal cut should be a bit below the gills. Another horizontal cut should be made about an inch or two above the pelvic fin/claspers/female dogfish genitalia. Then, make a vertical incision from the first horizontal cut to the second, across the belly. The cuts should resemble the letter "I"
6. Reveal the insides of the shark by opening the cut flaps
7. First observe the liver and liver oil, which is large and gray, while the liver oil is yellow. What do you notice?
8. The observe the heart, which is at level with the gills and is in the middle of the shark. You may have to cut more above if you cannot see it.
9. Observe the gills, both outside and inside. You may have to make further cuts if you cannot see inner side of the gills yet. Take note of their structures. What can you infer from them?
10. The stomach is beige, and is around the middle region of the shark. Cut it open. What do you see inside?
11. Do the above steps for the intestines as well. What do you notice is inside?
12. Optional: Observe the brain, eyes, and other parts of the body you may be interested in. Tilt your scalpel as if you were shaving ice in order to peel off the cartilage on the shark's skull if you do attempt to cut it open.

Observations:

For the observations portion, include the reflection/observations that you completed on the observation sheet. Attempt to answer all of the questions given and record as many observations as possible. You may copy this section from above and paste here if you feel that it is an accurate representation of your observations.

As intended, our dissection led us to conclude multiple things about the Spiny Dogfish Shark. The first thing we begun with was the fins. The dogfish has several fins, each with a designated use. The Caudal fin, for instance is located in the back and similar to a tail helps

increase speed. The Dorsal fin is on the top of the shark, and might help guide the shark through water. Pelvic fin can be found on the bottom of the shark with most likely reproductive uses.

Observations, continued:

Finally, the Pectoral fins are two fins on the side of the shark which most likely improve swimming and steering. We also noticed the Placoid Scales, which is basically the skin of the shark, increases the shark's speed because it is hydro dramatic. The lateral line system and the ampullae of Lorenzini both help the shark to sense electromagnetic waves, improving their sight in dark, murky waters. The snout of the shark is used to cut through water, decreasing water resistance when swimming. Spiracles, small holes behind the shark's eyes help the shark breathe. The shark we had dissected was male. This is because it had claspers, fins only reserved for males.

However, the inside of the dogfish also revealed many findings. For instance, the shark has a very small heart compared to humans, large livers covered in liver oil and gills instead of lungs. It should also be noted that the liver oil is most likely there in order to insulate and keep heat in the shark's body. The stomach was only a bit larger than the heart, and the intestines were also small and squishy. Both digestive organs are also very slim in shape, due to the fish's size.

Analysis:

Answer the focus question for the lab in a few paragraphs. Based on the anatomical structures of the spiny dogfish shark, how is the spiny dogfish shark adapted to survive in its environment? Be sure to include a discussion of the major anatomical structures that you observed during the dissection that help this shark survive in your analysis. Focus on topics such as how the shark reproduces, catches prey, senses its surroundings, swims, controls its buoyancy, protects itself, etc.

Based on our observations, the dissection of the dogfish led us to believe that each characteristic of the shark had an individual purpose intended to increase its survival. One clear example is the coloration of the dogfish. The top of the shark or the dorsal side was a dark blue-grey color, while the bottom or ventral side of the shark was cream/light colored. This benefits the dogfish shark because it helps the shark camouflage to its environment. The top of the shark blends into the top of the ocean, while the bottom of the shark blends into the ocean floor, effectively hiding itself from predators. Another example of an adaptation the dogfish possesses is its variety of fins. These fins help the shark generate momentum, cut through water and as a whole, increase the swiftness and speed of the shark. The final example of a beneficial trait the dogfish has are the gills, which help the shark breathe in fresh air. They filter oxygen from the water and into the shark, functioning like a filter, just in the form of soft flaps. Based on these anatomical structures, we can infer that the spiny dogfish shark is well-adapted to its environment and harbors many traits that are beneficial to its survival.

Conclusion:

End your lab report with a conclusion where you discuss the observations and the inferences that you made in the dissection. Try to discuss things you learned about the shark that you might not have already known from class. Feel free to also discuss what you found interesting and/or what surprised you while dissecting the shark. Also discuss possible sources of error.

Like its purpose centuries ago, animal dissection still serves to immensely educate many on the anatomy of organisms, any other related organisms all while advancing the surgeon's scientific knowledge further in other departments. For instance, the first time dissecting the dogfish with my peers, we had discovered that the stomach was much smaller than expected, while the liver took up more space than the intestines and stomach combined. When dissecting it a second time, with a

different group of peers, we had discovered an unchewed chunk of fish in the stomach. Even though I had already dissected the fish's stomach once, I still continued to learn something new the second time (Dogfishes don't need to chew). Another interesting characteristic I learned about dogfish is that they do not have a single solid bone, but rather only cartilage, the kind of substance that makes up your ears and baby bones. I was surprised to find the disproportionality among organs in the dogfish so prevalent. The liver seemed oversized compared to a humans, yet the heart, stomach and intestine seemed miniature in terms of human proportionality. There is very little to improve the experience of the shark dissection, however, having sharper scalpels or better tools might make precise incisions easier to perform as well as more efficiently and fast. Perhaps also encouraging to cut the muscle off the shark might give more insight to all animals, as they all have similar "muscle" structures. To finish off, the animal dissection was an incredibly entertaining, interactive and educational experience. It has furthered my knowledge of animal anatomy by a large percentage.

Bibliography/Works Cited:

List at least 2 sources that you used to gather background information on the shark and any other sources that you used while completing this lab report. Create citations of the sources using MLA format. Consider using *easybib.com* for help with this. On *Easybib.com*, copy and paste the sites you used to conduct your research. I will generate a Bibliography or Works Cited page for you.

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